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CONCLUSIONS FROM THE STUDY OF ONE HUNDRED AND TWENTY-FIVE CASES OF WRITER'S CRAMP AND ALLIED AFFECTIONS.*

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DURING the past few years I have been specially investigating the disease known as *writer's cramp* and affections allied to it, as *telegrapher's cramp*, *musician's cramp*, and the *cramp of sewing-women*, and others engaged in occupations that draw so severely and exclusively on certain muscles as to induce weakness of those muscles and of the nerves that supply them.

These investigations have been pursued in various ways—by the study of cases in my practice; by conversation and correspondence with physicians from all parts of the country and other countries; by consultation with physicians in regard to cases, and by circulars of inquiry that have been noticed in various journals and brought to the attention both of physicians and the sufferers from the disease. The inquiry has extended to England, Germany, and Australia.

The conclusions at which I have arrived, stated in the most condensed manner possible, are as follows. I present the results without argument or discussion, reserving the details for a subsequent occasion, and shall here confine myself to those facts that are more or less novel and unfamiliar, and of the greatest scientific and practical interest.

The main results can be stated in these eight propositions:

First.—What is called the *cramp* is but one of a large number of the symptoms of this disease, and no two cases are precisely alike.

There are at least fifteen or twenty other symptoms of this disease. The recognition of these symptoms, especially in the early and premonitory stage, is of the highest moment, for the reason that in the early stage the disease is curable.

The *cramp* in those cases, where it appears, is oftentimes one of the later symptoms, and bears much the same relation to the disease that the symptoms of the *ataxia gait* bears to the disease *locomotor ataxy*. In some cases there is no *cramp* from first to last, and in all cases the *cramp* is preceded or accompanied by other symptoms.

The list of symptoms of *writer's cramp* is as follows: 1, *fatigue, exhaustion*; 2, *dull, aching pain*; 3, *nervous, irritable feeling*; general nervousness; 4, *trembling, unsteadiness*; 5, *cramp, spasm, jumping, twitching, rigidity, contraction of muscles* (in some cases the pen is involuntarily hurled at a great distance, as across the room); 6, *stiffness and tightness*; 7, *powerlessness, helplessness*; 8, *numbness, areas of*

anæsthesia, tingling; 9, *neuralgia*; 10, *burning, stinging, dancing, prickly feeling*; 11, *soreness*; 12, *throbbing and swelling feeling*; 13, *thrilling, running, electric sensations*; 14, *tightly-bound feeling of wrist*; 15, *coldness*; 16, *abnormal sensitiveness to touch or cold, or mental influences*; 17, *disinclination to write*; 18, *slowness in writing*; 19, *itching*; 20, *perspiration*; 21, *temporary aphasia*; 22, *dryness of the joints*; 23, *swelling of the wrist and hand*; 24, *actual paralysis*; 25, *abnormal grasp of the fingers on the pen-holder or pencil—a very common symptom; tendency of the fingers, especially the middle one, to slip out of their places on the pen-holder, creating a desire by the sufferer to moisten them to prevent slipping; bearing down on the paper with unnatural or unusual pressure.*

Many of the above symptoms are not confined to the hand, but extend to the forearm, arm, shoulder, neck, to the opposite arm, and over the whole body. It is clear, therefore, that the term *writer's cramp* is the worst possible misnomer, and that the disease has been most imperfectly understood in medical literature. It is wise, however, to retain the term both in scientific and popular circles, for in the prospective state of our knowledge no term capable of including precisely and exhaustively all the phenomena of the disease can be suggested. When any disease is designated by a term that is at once short, familiar, and easily retained, it is not well, as a rule, to attempt to displace it. To name diseases from prominent and special symptoms, and real or suspected factors in their causation is, during certain stages of medical progress, both natural and inevitable, as is illustrated by *hay-fever, epilepsy, hysteria, insanity, neuralgia*; and to attempt to substitute terms based on imperfect and changing knowledge of pathology, is to heighten the confusion that we would remove.

Secondly.—Also in the other forms of professional *cramp*, as that of *telegraphers, musicians* (violinists, organists, pianists, harpists), *sewing-women, painters, artists, dancers, hammer-palsy, and so forth, the cramp is but one of a number of symptoms, and by no means always the most important symptom*; and, as in *writer's cramp*, there is frequently no *cramp* at all from the beginning to the end of the disease.

There is no one symptom of the disease that can be said to be diagnostic. It is by taking a survey of all these symptoms, and by studying them in their relation to each other and to the history of the case that we are able to make out the diagnosis of *writer's cramp*, or of any of these allied disorders. This rule

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applies to the entire nervous system; there is not a disease known to neurology that can always be diagnosed by any single symptom; all the familiar disorders of the brain, of the spinal cord, or of the peripheral nerves are studied not through isolated phenomena, but through groups of phenomena, acting and reacting on each other; pathognomonic symptoms belong to lecture-rooms and text-books, not to practical experience.* An analogous disease, that has not been described, is the *counting-money cramp*, from which a lady-clerk in the Treasury Department at Washington once suffered; it is caused by excessive and restricted use of the fingers in handling bills.

Thirdly.—This disease is primarily a peripheral and local disease of the nerves and muscles; secondarily and rarely it becomes central and general, or it may result from various central lesions; and it may affect any point between the extreme periphery and the centre.

This view of the pathology is a compromise between the old view that it was central, and the theory of Poore, of London, that it is purely peripheral.

No two cases are precisely alike in their pathology, but there is no question that in some exceptional cases the disease extends to the centres. That it affects the left hand as well as the right is no proof that the disease is central; it simply develops to the left hand when that hand is used, for the same reason that it affects the right hand.

The theory that writer's cramp is a result of lesion or disturbance of special co-ordinating centres in the brain is not sustained by a single properly-understood fact; on every point it fails to account for and harmonize the phenomena. So far, my own conclusions are in entire accord with those of Dr. Poore, of London, who has investigated this subject most intelligently and successfully.†

In truth, the detailed pathology of writer's cramp is not simple, but complex; in some cases there is neuritis which may affect a single nerve-branch or several nerve-branches, and may be restricted to the fingers and hand, or extend up the forearm and arm; then the muscles may be merely exhausted—chronically fatigued—or with a tendency to spasm and contracture. The worst phase of the disease that I ever saw was in 1874, with Dr. Brodie, of Detroit; in that case the arm was drawn over to the back, and held firmly there by the contracted muscles; the patient was unable to use his hand for any purpose, and also suffered great pain.

In some cases the disease, or rather the tendency to the disease, is hereditary—two and three cases having been known in a single family.

Fourthly.—This disease occurs mostly in those who are of strong, frequently of very strong, constitutions, and is quite rare in the nervous and delicate; and when it does occur in those who are nervous, is easier relieved and cured than when it occurs in the strong.

This fact is not peculiar to writer's cramp, but applies to other nervous diseases, as impotence, muscular atrophy, and ataxy. I see every day cases of nervous exhaustion (neurasthenia) in its various forms, and quite rarely do I see writer's cramp in them; and when they do have this disease, it is mild and curable. I have successfully treated a number of these cases.

* Ataxy, for example, was formerly diagnosed by inability to stand with closed eyes, by the ataxic gait, and by the electric pains; and more recently an unsuccessful attempt has been made to prove that the absence of the tendon-reflex is a sure sign of that disease. There was no need of experiment to disprove this claim; the physiology and pathology of the nervous system are now in a condition, where we are able to prove deductively—without examination—that all such claims of pathognomonic symptoms, however reliable they may be as aids and accessories, are illogical and unscientific.

† Transactions of the London Medico-Chirurgical Society, vol. lxi.

Fifthly.—This disease is far less likely to occur in those who do original work, as authors, journalists, composers, than in those who do routine work, as clerks, book-keepers, copyists, agents, and so forth.

The reason is clear. Original thinkers must take time for thinking as they write, and thus they rest the nerves and muscles of the hand; while routinists, having little or no thinking to do, write on constantly and uninterruptedly, oftentimes at the extreme of their speed.

In some cases an attack of writer's cramp has followed a single task of long copying. In one of my cases—an authoress—there had never been any sign of the disease until she performed a task of routine work. Of my cases eight were physicians, eight were lawyers, five were clergymen, and the remainder were clerks, book-keepers, agents, copyists, and merchants.

Men who write bad, scrawly, illegible hands never have writer's cramp; it is the penalty for writing plainly and carefully. Like prevents like, and those who always write as though they had writer's cramp never have it.

Sixthly.—This disease, like all nervous diseases in this country, diminishes in frequency as we go South.

In the Gulf States writer's cramp and maladies allied to it are very rare. The same is true of hay-fever, which is a type of nervous diseases; and, indeed, of the whole family of functional nervous maladies, such as sick-headache and neurasthenia, or nervous exhaustion in all its manifestations.

In investigating this subject I have corresponded and conferred with physicians all through the South. Dr. Bryce, Superintendent of the Alabama Insane Asylum, Tuscaloosa, whose opportunities for observation have been very large, has written me a very interesting letter on this question.

Seventhly.—Writer's cramp is no longer an incurable disease.

In the early and forming stage, especially, it responds to treatment quickly, and in many cases permanently. During the stage of exhaustion, fatigue, and pain, with the other symptoms of numbness, neuralgia, irritability, trembling, powerlessness, soreness, coldness, stiffness, and so forth, this disease can be treated as satisfactorily as almost any other form of nervous disorder; and, even when cramp or spasms of the muscles have appeared, it may be entirely cured.

In the later stages, after the symptoms have existed for years, the malady may become absolutely hopeless, even though the patient abandon his occupation. I have seen cases that have been afflicted for over a quarter of a century.

One striking case of this kind I had opportunity to see through the courtesy of Dr. W. C. Wey, of Elmira, N. Y. Both hands were affected, and the numbness and powerlessness were so marked that sometimes a newspaper that he was reading would drop to the floor. The whole body seemed, indeed, to have been disturbed, and he had been obliged to give up his position as cashier of a bank.

In all these cases, the prognosis is better in nervous and delicate patients than in those who are phlegmatic and strong.

Eighthly and lastly.—The treatment of writer's cramp and affections allied to it consists:

1. In the use of electricity locally applied. Both galvanic and faradic currents may be used—preferably the former. In some cases galvanization of the spine and neck, and what are called spinal-cord nerve-currents, are indicated. Strong galvanic currents, with metallic electrodes, I have used with ad-

vantage in some cases where mild currents seemed to do no good. The wire brush with the faradic current I often use, and in some cases electro-puncture.

The relief of pain and fatigue that follows these electrical applications is immediate and uniform, and most grateful to the sufferer; and this temporary effect can be obtained even in the worst cases. I have not yet been able to demonstrate any very marked advantage from the rhythmical movements of the muscles in connection with the electrical applications.

2. Hypodermic injections of atropine, strychnia, duboisia, Fowler's solution, and other tonics, narcotics, and sedatives. These remedies need often to be gradually pushed to their physiological effects. Electricity and hypodermic injections combined have made an epoch in the treatment of writer's cramp. The evil effects of hypodermic injection are guarded against by care in preparing the solutions, by dilution of irritating substances, by moderately deep puncture, and by substituting other treatment in those cases where, from any constitutional tendency, suppuration is easily excited.

3. The internal use of calabar-bean, ergotine, iodoform, and in some cases of nerve-food, as oil and fats. It is useless, in the majority of severe cases, to dally with mild remedies or ordinary tonics.

4. *Massage*, or systematized kneading and manipulation of the muscles, with friction, and pinching, and pounding of the skin, and passive movements of the joints, large and small.

Dr. Douglass Graham, of Boston, has used this method with very encouraging success. I now employ it in all my cases. The whole arm should be treated.

5. The use of dry heat and dry cold, by rubber bags containing hot water or ice. These may be used alternately.

6. The actual cautery and very small blisters to the upper portion of the spine, or along the course of the affected nerves and muscles.

Rest alone, even long abstinence for many months from writing, will not cure writer's cramp, as has been proved by the experience of many cases. The best results I have ever had have been made with cases that kept right along with their occupation—although avoiding excessive work—with the aid of mechanical appliances.

Among the hygienic devices for the relief and cure of writer's cramp are the following:

1. The device for holding the pen—a ring-penholder—so as to relieve the thumb and fingers. An excellent arrangement of this kind has been perfected by one of my patients. By this contrivance the thumb is allowed perfect rest, and the index-finger and second finger are united by rings so as to make practically one finger, which is attached to the penholder. The over-use of the muscles most liable to be involved in writer's cramp is thus avoided. The gentleman who perfected this *ring-penholder* was himself substantially cured of a bad form of writer's cramp by its use in connection with electrical and other treatment, as above described. He is a book-keeper, and can now follow steadily his occupation, although troubled at times with symptoms of weariness. He kept right on with his occupation during treatment.

2. The type-writer. This instrument is destined to be of great practical service to writer's-cramp sufferers, as well as to those who, though not having the cramp, are made generally nervous and locally tired by the mechanical labor of writing. During the past year I have made many experiments with this instru-

ment, and studied carefully its relations to the nervous system, in order to determine these points. Unfortunately, book-keepers and those who write very short notes or messages and signatures cannot profit by the type-writer; but for those who write continuously the instrument is an almost perfect relief. After some instruction a reasonable degree of skill in its practical use can be obtained during the play-hours of two or three months.

Thurber's kaligraph, now almost forgotten, was an ingenious contrivance for writer's-cramp sufferers; but it is now superseded by the two inventions just noticed.

3. The use of large pen-holders, so that the muscles may be less restricted; fastening a piece of sponge to the penholder, so as to relieve the pressure of the fingers. One of my correspondents writes me that he used this device for a year.

4. Holding the pen between the different fingers, thus relieving the thumb and index-finger. One of my medical friends finds great relief by this device.

5. The use of quills and very flexible pens, and pens with very broad points, so as to run easily like quills. Some pens have been sent to me from Germany many that are made with this special object in view. The use of the lead-pencil is also a great relief. The mica pen and the Esterbrook stub-pen are worthy of trial.

6. Frequently changing the pen and the penholder and style of pen, so as to change the mode of action of the muscle. Dipping the pen for ink is usually regarded as an evil, but it doubtless saves many of us from writer's cramp.

7. Changing the position in writing, as from sitting to standing, or holding the paper in the lap. These methods of relief are to be commended, especially for those who are just beginning to have the symptoms of the disease, who are yet in the stage of exhaustion. It is a mistake to always try to point the pen toward the right shoulder. When utterly tired out, it is well to stop entirely.

8. The avoidance of faulty and painful methods of writing, and the study of easy, natural methods. A person who writes a cramped and stiff style, no matter though it be a legible one, is a fair subject for attack, especially if writing occupies most of the time. This factor is of great importance. An eminent author and journalist is accustomed to put his pen in the penholder at an angle of several degrees backward, and thus is able, as he tells me, to write consecutively over forty words a minute.

9. Writing with the left hand. Out of 18 cases that tried this plan, 3 failed utterly, 6 were partially successful, and 9 were completely successful. In the 6 partially successful cases the disease either appeared in the left hand, or after a time showed a tendency to appear there. At the beginning of the disease, educating the left hand may be of itself sufficient for a cure.

10. The use of various gymnastic and athletic exercises, as rowing, paddling, and so forth. In some cases the sufferers are unable to do many other kinds of work; carrying bundles or turning door-knobs hurts them just as writing does; but such cases are exceptions.

Speed of Handwriting.—In the study of this subject, I have made many experiments with a view to determine the average speed of handwriting. I find that between twenty-five and fifty words are written in a minute by those who are accustomed to write, the average being perhaps about thirty words when no time is lost in thinking or dipping the pen.

The method of experimenting that I have adopted

is, to have the subject experimented on write something with which he is quite familiar—words of all lengths—for one minute. Practically, no one writes steadily as fast as these experiments would indicate, for, after a few moments of writing at the very top of speed, there will come to the majority a weariness; then the delay of composition also interferes.

These experiments were made with lawyers, physicians, clerks, book-keepers, scientists, and men of letters. Mr. T. A. Edison, the inventor, is also an expert in handwriting, and I have made with him a number of experiments in order to test the rate of speed of different varieties of penmanship. When he writes slowly and with care—from fifteen to twenty-five words a minute—Mr. Edison's handwriting is phenomenally clear and beautiful, resembling copperplate printing; not in a flowing, but in a cramped hand, the letters being often separated as in print. When he rises to forty words a minute, the writing is still more cramped and less beautiful, though yet legible; with forty-nine words a minute, his writing is quite illegible.

I find that journalists write with a lead-pencil—which, as a class, they generally use—from forty to fifty words a minute. Experts on the type-writer, according to my experiments, can print for a short time at dictation from seventy-five to one hundred words a minute; but in practice, very few of those who use the instrument put down on the average more than half that number.

A number of years ago a man attempted on a wager to make with a pen an enormous number of up and down strokes—a million, I believe, within a month or less time. Swelling of the hand and wrist, with severe pain, so annoyed the experimenter that it was necessary for some one to stand near him and pour on cold water and apply various lotions. In this cramped and continuous movement and tension of muscles is found the philosophy of all these forms of professional cramp. I have made some experiments with myself in order to ascertain just how many single disconnected up and down strokes I could make with a pen; and find that from 175 to 200 a minute is about the limit, and very soon the hand becomes wearied. A friend of mine, connected with the Surrogate's office in this city, tells me that the clerks in that department sometimes complain of swelling of the wrist from over-writing.

Mr. Edison, whose amazingly fertile mind is constantly making original suggestions even in departments quite remote from his own, showed me not long ago the following fundamental experiment. A small rod of steel or iron, or other hard substance, about one-third of an inch in diameter, is held very firmly between the thumb and forefinger of the left hand;

very soon there comes a pain in the adductor of the thumb, which may be unbearable. This position is a familiar one to manufacturers of electrical apparatus, since it represents their method of winding wire on bobbins.*

Telegrapher's and Musician's Cramp.—The above practical conclusions in regard to treatment apply to the other forms of professional cramp, as that of telegraphers and musicians—violinists, organists, pianists, and harpists; also to the cramp of artists, painters, engravers, and sewing women.

Telegraphic operators have two forms of cramp—the ordinary writer's cramp, from receiving and writing out messages; and true telegrapher's cramp, from striking the index-finger on the sending instrument. The malady is quite a common one among telegraphers; and an attempt has been made to reduce its frequency by the use of a rubber cap on the button on which the finger presses in sending. This device is, I understand, but partially successful.

Musicians, when afflicted with cramp, have the same symptoms as writers, and are likely to suffer in both hands, although one hand may be affected quite differently from the other. In one case that I saw through the courtesy of Dr. Webber, the right hand, on beginning to play, showed contraction of the muscles of the thumb and index-finger, with a tendency upward; while in the left hand, at the same time, the second and third finger were firmly flexed into the hollow of the hand, so that they could be opened only with great difficulty. In a case now under my care, the right hand is affected in precisely the same way, while in the left hand the little finger only is disturbed. This form of trouble often comes from stretching the hand in playing octaves.

In another case the third finger of the right hand is raised involuntarily while playing; and in an organist now under my care there is simply stiffness and pain in the interossei between the third and little finger, and anæsthesia of the back of the hand. In the case of a very eminent violinist the muscles of the left arm and forearm, and also the fingers, were so weak and exhausted from long holding the violin in position, that he had to abandon his profession.

I have succeeded in curing a long-standing case of pianist's cramp, where the symptoms seemed to depend on a neuritis, excited originally by exposure to cold in bathing, and made worse by severe practice at the piano. In this case there had been great uneasiness, and even severe pain after playing, and he had abandoned his profession. He is now able to play several consecutive hours without fatigue.

* Since this was written my attention has been called to two cases of *Barber's Cramp* from the excessive handling of the razor in the operation of shaving.

